

REMARKS

Favorable consideration of this application is respectfully requested.

Claims 1-31 are currently active in this case. Claim 20 has been amended by way of the present amendment. The amended claim is supported by the specification and claims as originally submitted and no new matter has been added.

In the outstanding Official Action Claim 20 was rejected under 35 U.S.C. §112, second paragraph as failing to distinctly claim the subject matter; and Claims 1-20 and 25-31 were rejected under 35 U.S.C. §103(a) over *Ginetti* (U.S. Patent No. 6,622,291).

Applicant appreciatively acknowledges the Examiner's identification of allowable subject matter in Claims 21-24.

Applicant has amended Claim 20 to indicate the definition of L and U as requested by the Examiner in the outstanding Office Action.

Applicant respectfully traverses the rejection of Claim 1 under 35 USC 103 as being obvious in view of *Ginetti*. Claim 1 recites:

A method of slack allocation within a timing graph, comprising the steps of:
setting an initial edge time for each edge in the timing graph;
setting a weight value for each edge in the timing graph; and
iteratively performing the following steps:
computing an amount of the available slack to be budgeted to each edge of the graph;

***for each edge having a weight greater than zero,
if the computed slack is greater than a
predetermined epsilon, then restore the edge time to that
in an immediately preceding iteration, and
if the computed slack is less than or equal to the
predetermined epsilon, then saving a current edge time
and setting a weight of the edge to zero;
stopping the iterative steps if an amount of slack
to allocate is less than the predetermined epsilon;
determining a new budget for each edge; and
incrementing the edge time for each edge by the
corresponding new budget;
until the iterative steps are stopped or a maximum
number of iterations is performed.***

However, *Ginetti* fails to teach or suggest the claimed subject matter.

Applicant respectfully notes that *Ginetti* provides an innovative method for physical budgeting during RTL floorplanning, which includes RTL estimates, physical partitioning, block placement, and the allocation of global timing constraints to each block. However, *Ginetti* does not teach the claimed invention.

Applicant respectfully traverses the assertion in the outstanding Office Action that states *Ginetti's* method of slack allocation includes the step of: "setting an initial edge time for each edge in the timing graph (Figs 1-6)." In particular, Applicants respectfully note that the referenced Figs. 1-6 neither indicate nor hint at setting initial edge times for each edge in a timing graph.

More specifically, *Ginetti* describes FIG. as "a high level flow chart of a Timing Optimization loop starting from an "Estimated RTL" and a set of constraints," FIG. 2 as "a graphical illustration of a modeled flexible cell composed of fanout free cones of logic, buffer trees, and sequential elements," FIG. 3 as "an

illustration of a balanced and unbalanced buffer tree," FIG. 4 as "an illustration of a buffer tree having three arcs accelerated and a slow down of the remaining 13 arcs," FIG. 5 as "an illustration of a hierarchical instance output terminal that drives a scattered fanout," and FIG. 6 as "an illustration of accelerating an input of a gate." However, neither the figures themselves nor any of the corresponding description of those Figures in *Ginetti* describe setting an initial edge time for each edge in the timing graph. In contrast, Claim 1 specifically recites "setting an initial edge time for each edge in the timing graph".

Furthermore, as admitted in the outstanding Office Action, *Ginetti* does not teach or suggest a predetermined epsilon as claimed. More importantly, as claimed, the predetermined epsilon is a value used for directing further more refined steps in the claimed method. Such steps include to:

"restore the edge time to an immediately preceding iteration," ... if the computed slack is greater than the predetermined epsilon, and

"saving a current edge time and setting a weight of the edge to zero," ... if the computed slack is less than or equal to the predetermined epsilon.

However, neither the *epsilon*, nor the steps of *restoring*, *saving*, or *setting* based on the epsilon are either taught or suggested by *Ginetti*.

Applicant respectfully traverses the assertion that states that a practitioner in the art would have found that *Ginetti* implies the claimed epsilon in the cone and buffer timing tree. Applicant respectfully notes that *Ginetti* makes no such implication. In fact, *Ginetti* describes in great detail how circuit paths within

blocks are estimated, for example, to find a feasible timing for the block, and then global timing is allocated to each block based on the approximate block timing, (col 2, lines 56-67, see Abstract), but does not mention or imply the above described epsilon or associated steps.

Therefore, Applicant respectfully submits that Claim 1 cannot be considered obvious over Ginetti because Ginetti fails to teach or suggest the claimed subject matter. Accordingly, Applicant respectfully submits that Claim 1 is patentable.

Regarding Claim 2, Applicant respectfully traverses the assertion that Ginetti's net weight implies the claimed slack to weight ratio. Applicants admit that Ginetti provides a useful description of detecting congested cones and distributing slack to the congested cones. However, Ginetti make no implication that the slack distribution is done based on a slack-to-weight ratio. In fact, Ginetti's figures 22 and 23 describe distributing slack that differentiates between congested and non-congested arcs in a congested cone (col. 21, line 59 – col. 22, line 4).

Furthermore, the distribution of slack is based upon a median value rather than a slack to weight ratio (col. 21, line 64). And, still further, Ginetti describes specific arcs within the cone as totally frozen (col. 22, lines 3-4), which is in direct contravention to Claim 2's step of ***"increasing the edge time for each edge by an amount equal to a weight of each edge multiplied by the determined slack-to-weight ratio."*** Accordingly, Applicant respectfully submits that 2 is further patentably distinct over *Ginetti*.

Applicant respectfully traverses the rejection of Claim 5 under 35 USC 103 over *Ginetti*. Claim 5 recites:

***A method for performing analysis on a set of domain restricted timing cones, comprising the steps of:
selecting a domain restricted timing cone;
determining a slack to weight ratio for each edge in the domain restricted timing cone;
for each edge, if the determined slack to weight ratio for an edge is less than a current slack to weight ratio for that edge, then, replacing the current slack to weight ratio with the current slack to weight ratio;
selecting a next domain restricted timing cone and repeating said steps of determining and replacing until each timing cone has been analyzed.***

However, *Ginetti* fails to teach or suggest similar subject matter.

Again, Applicant respectfully traverses the assertion that a practitioner would find that *Ginetti* implies the slack-to-weight ratio described and claimed in Claim 5. Applicants admit that both *Ginetti* and the present invention discuss slack distribution, it should be clear that the approaches are different. In fact, *Ginetti* teaches away from the claimed method of slack allocation because *Ginetti* suggests a specific slack distribution that does not have flexibility to allocate slack to some paths. In addition, *Ginetti's* slack distribution on arcs instead of edges, and distributes slack based on the congestion in an arc of a congested cone. In contrast, the present invention distributes slack to each edge based on a slack-to-weight ratio not discussed or implied in *Ginetti*.

Therefore, Applicant respectfully submits that Claim 5 cannot be considered obvious over *Ginetti* because *Ginetti* fails to teach or suggest similar subject matter. Accordingly, Applicant respectfully submits that Claim 5 is patentable over *Ginetti*.

Applicant respectfully traverses the rejection of Claim 9 under 35 USC 103 over *Ginetti*. Claim 9 recites:

***A method of computing a time budget for each edge in a Domain Restricted Timing Cone (DRTC) that can be represented in a graph, comprising the steps of:
determining timing constraints including a required output time (R) for an endpoint of the DRTC and an arrival time (Ai) for each input (i) of the DRTC;
decorating each vertex in the graph with a time to endpoint (tte) value and a weight to endpoint (wte) value;
computing a smallest slack to weight on each edge of the graph within the DRTC using the tte and wte pair for each edge.***

However, *Ginetti* fails to teach or suggest similar subject matter.

Applicant respectfully traverses the assertion that *Ginetti's* disclosure implies a computation of the smallest slack-to-weight ratio to each edge, for at least the following reasons. First, as noted above, and as admitted in the outstanding Office Action, *Ginetti* does not disclose a slack-to-weight ratio. However, Claim 9 specifically recites use of a slack-to-weight ratio.

Second, Claim 9 goes much further than simply reciting a slack-to-weight ratio. In fact, Claim 9 recites a computation of a smallest slack-to-weight ratio on each edge of the graph within the DRTC using the tte and wte pair for each edge. Therefore, even if a slack-to-weight ratio is implied in *Ginetti*, *Ginetti* does not go further to suggest the specific step recited in Claim 9. Accordingly, Applicant respectfully submits that Claim 9 is patentable over *Ginetti*.

Based on the patentability of independent Claims 1, 5 and 9, Applicants respectfully submit that dependent Claims 2-4, 6-8, and 10-31 are also patentable.

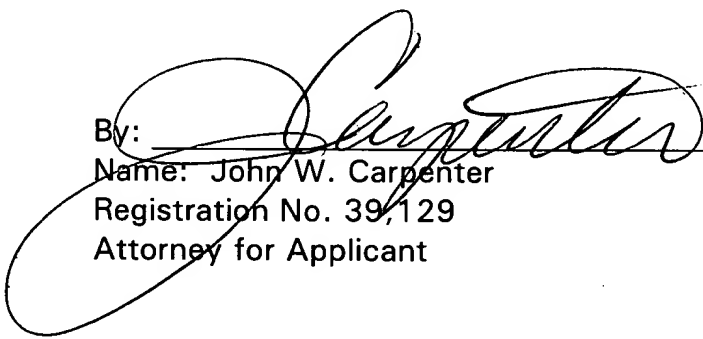
Consequently, no further issues are believed to be outstanding, and it is respectfully submitted that this case is in condition for allowance. An early and favorable action is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees (or credit any overpayment) associated with this communication and which may be required under 37 CFR §1.16 or §1.17 to Deposit Account No. 50-2603, referencing **Attorney Docket No. 351891.04000 (21891.04000)**. A duplicate sheet is attached.

Respectfully submitted,
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